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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/935,776	08/22/2001	Charles M. Lieber	H00498.70054/TJO/DPM	8935

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WOLF GREENFIELD & SACKS, PC  
FEDERAL RESERVE PLAZA  
600 ATLANTIC AVENUE  
BOSTON, MA 02210-2211

EXAMINER

HU, SHOUXIANG

ART UNIT PAPER NUMBER

2811

DATE MAILED: 04/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/935,776

Applicant(s)

LIEBER ET AL

Examiner

Shouxiang Hu

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- The MAILING DATE of this communication appears on the cover sheet with the correspondence address -

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 1 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 1/29/03.
- 2a) ☐ This action is FINAL.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-333 is/are pending in the application.
- 4a) Of the above claim(s) 203-260 and 263-333 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) \_\_\_\_\_ is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) 1-202, 261 and 262 are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                             | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Election/Restrictions*

1. Claims 203-260 and 263-333 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in Paper No. 10.

Applicant's election with traverse of claims 1-202, 261 and 262 in Paper No.10 is acknowledged. The traversal is on the ground(s) that a single search and examination would cover all claims and would not place undue burden on the examiner. This is not found persuasive because the groups 1-3 inventions as defined in the previous Office action are classified in different classes/subclasses and are substantially mutually distinction. Searching and examining all these inventions together would certainly place undue burden on the examiner. Besides, as noted before, upon the allowance of the linking claim(s), the restriction requirement as to the linked inventions shall be withdrawn and any claim(s) depending from or otherwise including all the limitations of the allowable linking claim(s) will be entitled to examination in the instant application.

The requirement is still deemed proper and is therefore made FINAL.

2. Accordingly, claims 1-333 are pending in this application; and claims 1-202, 261 and 262 remain active in this Office action.

***Species Election/Restrictions***

3. This application contains claims 1-202, 261 and 262 further directed to the following patentably distinct species of the claimed invention:

Species 1, directed to a semiconductor formed of a material selected from a group consisting of: Si, Ge, Sn, Se, Te, B, Diamond and P, as recited in claim 4.

Species 2, directed to a semiconductor formed of a solid solution selected from a group consisting of: B—C, B—P(BP6), B—Si, Si—C, Si—Ge, Si—Sn and Ge—Sn, as recited in claim 6.

Species 3, directed to a semiconductor formed of a material comprising a Group IV-Group IV semiconductor, as recited in claims 7 and 8.

Species 4, directed to a semiconductor formed of a material comprising a Group III-Group V semiconductor, as recited in claims 9 and 10.

Species 5, directed to a semiconductor formed of an alloy comprising a combination of two or more Group III-Group V semiconductors from a group consisting of: BN/BP/BAs, AlN/AlP/AlAs/AlSb, GaN/GaP/GaAs/GaSb, InN/InP/InAs/InSb, as recited in claim 11.

Species 6, directed to a semiconductor formed of a material comprising a Group II-Group VI semiconductor, as recited in claims 12 and 13.

Species 7, directed to a semiconductor formed of an alloy comprising a combination of two or more Group 11-Group VI semiconductors from a group consisting of: ZnO/ZnS/ZnSe/ZnTe, HgS/HgSe/HgTe, BeS/BeSe/BeTe/MgS/MgSe,

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CdS/CdSe/CdTe; or comprising a combination of a Group II-Group VI semiconductors from a group consisting of: ZnO/ZnS/ZnSe/ZnTe, CdS/CdSe/CdTe, HgS/HgSe/HgTe, BeS/BeSe/BeTe/MgS/MgSe and a Group III-Group V semiconductors from a group consisting of: BN/BP/BAs, AlN/AIP/AlAs/AlSb, GaN/GaP/GaAs/GaSb, InN/InP/InAs/InSb, as recited in claims 15 and 16.

Species 8, directed to a semiconductor formed of a material comprising a Group IV-Group VI semiconductor, as recited in claims 16 and 17.

Species 9, directed to a semiconductor formed of a material comprising a Group I-Group VII semiconductor, as recited in claims 18 and 19.

Species 10, directed to a semiconductor formed of a material selected from a group consisting of: BeSiN<sub>2</sub>, CaCN<sub>2</sub>, ZnGeP<sub>2</sub>, CdSnAs<sub>2</sub>, ZnSnSb<sub>2</sub>, CuGeP<sub>3</sub>, CuSi<sub>2</sub>P<sub>3</sub>, (Cu, Ag)(Al, Ga, In, Tl, Fe)(S, Se, Te)<sub>2</sub>, Si<sub>3</sub>N<sub>4</sub>, Ge<sub>3</sub>N<sub>4</sub>, Al<sub>2</sub>O<sub>3</sub>, (Al, Ga, In)<sub>2</sub>(S, Se, Te)<sub>3</sub> and Al<sub>2</sub>CO, as recited in claim 20.

Species 11, directed to a semiconductor formed of a material which is magnetic, as recited in claims 51-55.

4. Furthermore, for each of the above distinctive Species 1-11, further election is required to elect a single corresponding device (or application) from the distinctive devices (or applications) as recited in claims 111-202, 261 and 262, including: a switch; a diode; a Light-Emitting Diode; a tunnel diode; a Schottky diode; a Bipolar Junction Transistor; a Field Effect Transistor; an inverter; a complimentary inverter; an optical sensor; a sensor for an analyte (e.g., DNA); a memory device; a dynamic memory

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device; a static memory device; a laser; a logic gate; an AND gate; a NAND gate; an EXCLUSIVE-AND gate; an OR gate; a NOR gate; an EXCLUSIVE-OR gate; a latch; a register; clock circuitry; a logic array; a state machine; a programmable circuit; an amplifier; a transformer; a signal processor; a digital circuit; an analog circuit; a light emission source; a photoluminescent device; an electroluminescent device; a rectifier; a photodiode; a p-n solar cell.; a phototransistor; a single-electron transistor; a single-photon emitter; a single-photon detector; a spintronic device; an ultra-sharp tip for atomic force microscope; a scanning tunneling microscope; a field-emission device; a photoluminescence tag; a photovoltaic device; a photonic band gap materials; a scanning near field optical microscope tips; a circuit that has digital and analog components; and a semiconductor device comprising a silicon substrate having an array of metal contacts a crossbar switch element formed in electrical communication with the array and having a first bar formed of a p-type semiconductor nanowire, and a second bar formed of an n-type semiconductor nanowire and being spaced away from the first bar and being disposed transversely thereto.

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species from Species 1-11 and a single device (or application) corresponding to that single disclosed species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, at least claim 1 appears to be generic to at least most of the claims.

**Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and**

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**a listing of all claims readable thereon**, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

Applicant is advised that the reply to this requirement to be complete must include an election of the invention to be examined even though the requirement be traversed (37 CFR 1.143).

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a petition under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(l).

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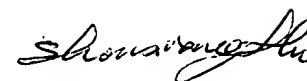
**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shouxiang Hu whose telephone number is (703) 306-5729. The examiner can normally be reached on Monday through Thursday, 7:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

SH  
April 1, 2003

  
Shouxiang Hu  
Patent Examiner  
TC2800